



Carbon farming:

Opportunities for agriculture and farmer to
gain from decarbonization

ihsmarkit.com

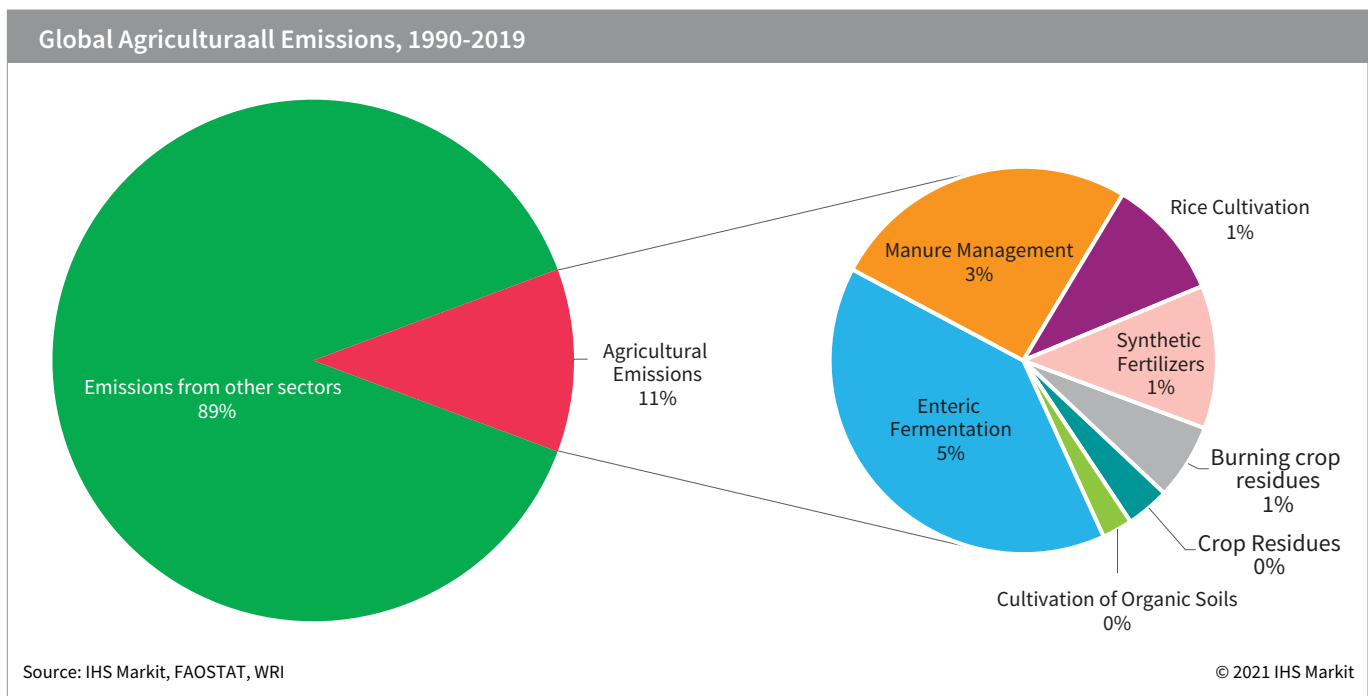


Carbon markets in agriculture

A growing global population has increased food demand, resulting in a carbon footprint from agricultural activities that continues to impact the environment negatively. While agriculture is part of the problem, it can also become a part of the solution.

By some measures, CO₂ emissions from agricultural production account for 11% of global greenhouse gas emissions¹ (GHE), driven in particular by the livestock sector. In response, new carbon markets tailored to farming and agricultural activities have emerged with increasing interest from farmers, private corporations and governments. While farmers and ranchers are already sequestering carbon through sustainable soil, crops, livestock and agroforestry management practices, investments in carbon markets by the private sector are gaining share and are principally driven by:

1. Legal obligations,
2. Voluntary goals (e.g. corporations, industrial or municipal operations interested in meeting publicly stated goals on environmental impacts), and/or
3. Shareholder or consumer expectations. Government has a role to play in establishing protocols and certifying mechanisms to accurately verify carbon offsetting efforts.



1. World Resources Institute (WRI), 2019

Driving forces of carbon demand

Effective public sector environmental policies that strengthen climate change adaptation and mitigation across economies will further drive demand for carbon credits in agriculture.

The global market for carbon trading systems has grown rapidly in the past 20 years with the largest and most liquid markets in Europe and California. The common driver in these carbon markets has been public policy measures to support demand and spur investment. Now more regions are following suit. China introduced a cap-and-trade program in 2020 that will be double the size of emission reduction by Europe Emissions Trading System (ETS)². The U.S. Department of Agriculture (USDA) Secretary announced the agency's goal to reduce the US agriculture carbon footprint by 40% by 2050. In response, the “*Growing Climate Solution Act*” has been proposed in the US House of Representatives. If passed, the act would create protocols allowing farmers and ranchers to monetize conservation practices and reduce their carbon footprint.

At the state level, California is progressing climate resiliency through its regulated Cap-and-Trade Program that allows large polluting entities to use more than 200 million metric tons of carbon offsets through 2020, whereas the next auction is scheduled for May 19, 2021. and has continuing auctions scheduled going forward. Another successful example is the European Union ETS that includes agriculture as one of the sectors for carbon sequestration. As a result of EU ETS and additional carbon initiatives, total EU emissions have been reduced by 24% between 1990 and 2019³. In summary, effective environmental policies that strengthen climate change adaptation and mitigation across economies will further drive demand for carbon credits in agriculture.

The private sector is a significant source of demand for voluntary and compliance carbon markets. Carbon offsets have become a business imperative for companies that realize the emerging opportunities in low carbon markets. In 2019, 1,600 companies worldwide disclosed that they currently use internal carbon pricing or that they anticipate doing so within 2 years⁴. In a study on ecosystems mechanisms, IHS Markit examined companies across several sectors including energy, airlines, chemical, fertilizer, financial, and information and telecommunications to evaluate potential demand for carbon credits. **IHS Markit estimates that the food and beverage sector accounts for 57% of total potential demand for carbon credits tied to agricultural lands. Based on all sectors examined, internal company prices currently range from \$5 to \$60/tCO₂e.** Participating companies have a vested interest in being directly involved with farmers in the value chain through reducing carbon in upstream and downstream activities. Many food and beverage companies are already committed to working with their suppliers in the value chain to reduce their carbon footprint. Hence, the private sector is a significant source of demand for voluntary and compliance carbon markets today.

2. World Bank States and Trends Report, 2019

3. European Commission Action, 2020

4. CDP Disclosure, 2019

Table 1: examples of carbon credit initiatives by public & private sector

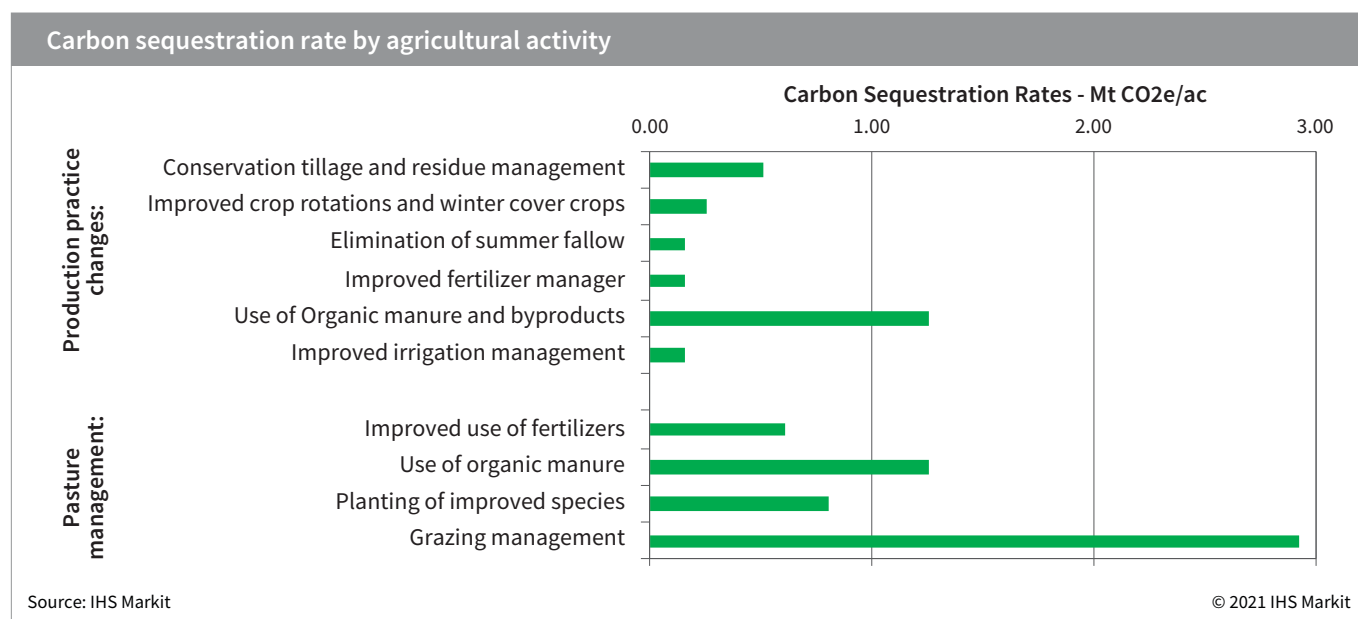
	Cargill	Indigo ag	California air resources board (carb)
Goal	Cargill made a commitment to reduce supply chain emissions by 30% by 2030 that aligns with commitment goals set out in the Paris Climate Agreement.	Indigo Ag, an agricultural technology company, intends to remove one trillion tons of carbon dioxide from the atmosphere across 3.6 billion acres of “farmland”.	CARB introduced the “Rice Cultivation Projects Compliance Offsets Protocol” in 2015, which is the first protocol that measures GHG reductions from crop-based agriculture. As Part of the Cap-and-Trade program, private sector can buy carbon credits for their offset targets.
Carbon mitigation & sequestering activities	In collaboration with the Iowa Soybean Association and using USDA’s COMET-Farm Tool to measure carbon sequestration, the Soil and Water Outcomes Fund will allow Cargill to pay farmers to adopt sustainable practices such as reduced tillage and cover crops to sequester carbon	The “Terraton Initiative”, aims to reduce emissions by encouraging farmers to adopt regenerative farming practices. This includes planting cover crops, reducing the use of chemicals and fertilizers, rotating different crops and integrating livestock to improve soil health.	Rice farmers who have been cultivating for min. 2 years and have soil with 3% or less organic content in the top 10 cm on the soil, volunteer to implement one of three methods included in the protocol to sequester carbon: 1) dry seeding, 2) early drainage, or 3) alternative wetting or drying.
Participants	As of February 2021, 10,000 acres of farmland has been enrolled by Iowa farmers	As of February 2021, 20 million acres have submitted plans to apply practices through Indigo Carbon, a payment system set up for the initiative	As of 2019, 21 rice growers across 22,000 acres had signed up for the Protocol.
Carbon Price/ Payments	The program estimates carbon payments to be \$30 -\$45/acre	Farmers are paid \$15 per verified 1 MT of CO ₂ e.	Price is set according to the market e.g. in 2017, price per ton CO ₂ e was \$7
Financial Incentives & Co-Benefits	It is estimated that through this program, 7,500 tons of CO ₂ e will sequestered. Revenue of \$30,000 to \$45,000 for Iowa farmers	For every acre, 2-3 credits per year were sold. About 40-60 MMT CO ₂ e is sequestered with this initiative. In addition, farmers can expect an increase of \$30-\$45/acre/ year in potential gross income due to enrichment of soils.	Rice farmers can expect positive co-benefits such as water savings from dry seeding, healthier rice plants due to reduced flooding of rice paddies etc.

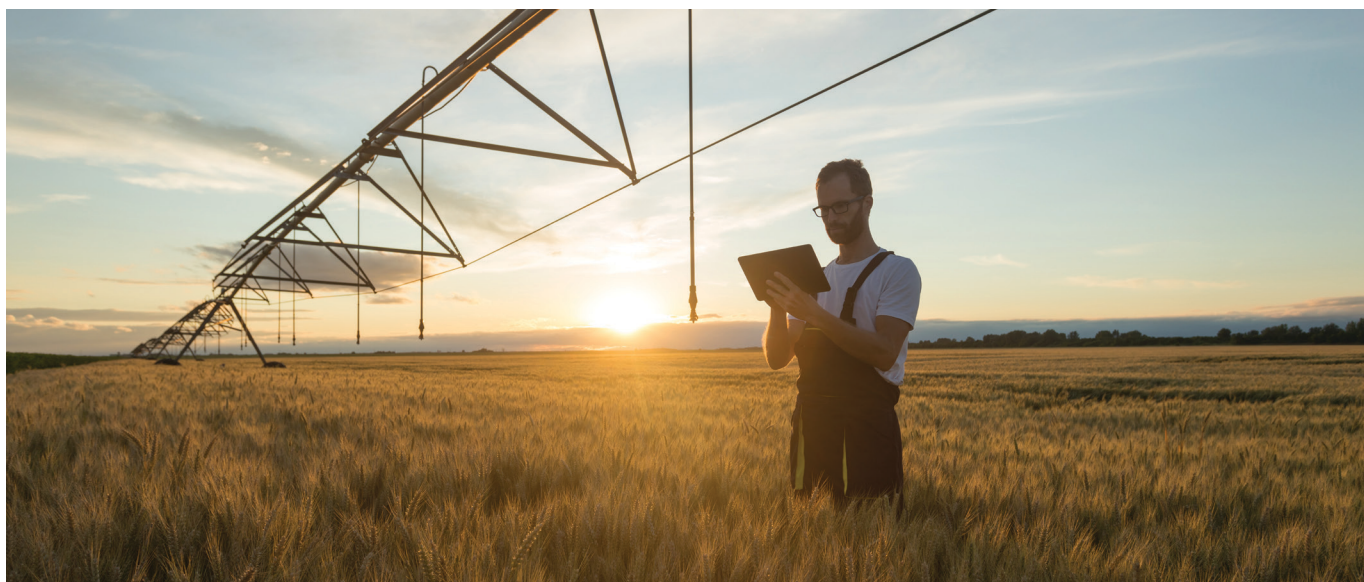
As seen in the above analysis, the market potential of agricultural solutions to offset carbon has indeed grown in recent years. IHS Markit estimates that in the United States the total potential supply of carbon credits in the agricultural sector is greater than 300 million tCO₂e annually and will keep increasing as agriculture carbon market is growing rapidly to meet corporate demand and to meet the global demand of 1 – 1.5 gigaton of CO₂e reduction. Demand drivers such as increasing consumer pressure, private sector investments in carbon pledges and potential for enabling regulations will reduce the large gap between demand and supply.



Opportunities for farmers & ranchers

The potential supply of over 300 million tons of carbon that can be sequestered gives US farmers and ranchers opportunities to benefit from financial incentives provided by carbon sequestration programs. Current carbon payments for carbon sequestration average at approximately \$30 per acre which is a 20% increase in profit margin for an average US corn farmer. As demand for carbon sequestration increase, carbon payments are also expected to rise with it. In addition to carbon payments, farmers will financially benefit from environmental benefits e.g. increased yields due to soil enrichment. If farmers take a more active role, they can increase income from carbon and one could see carbon farming as a larger share of profit margins. Carbon farming has potential to transform agriculture.





Challenges to realize “agri-carbon” market potential

Scaling the carbon market will require resources and capacity. While not exhaustive, the following list highlights issues raised by stakeholders (farmers, corporate buyers etc.) that need to be resolved in order to facilitate a successful “agri-carbon” market.

Inadequate Carbon Pricing	Lack of Institutional & Technical Capacity	Additionality Risks
<p>Breakeven prices for applying carbon offset practices (e.g. no tillage) can vary sharply on region and crop. A USDA study⁵ estimates the potential breakeven prices for converting from conventional till to no-till by region and crop varied from \$21/tCO₂e in the Northern Plains to as high as \$104/tCO₂e in Corn Belt in US.</p> <p>IHS estimates that in the US, carbon prices currently range from \$3.30 to \$200/tCO₂e depending on region and whether markets are voluntary or statutory.</p> <p>The price depends on the type of carbon offset project, the carbon standard under which it was developed, the location of the offset, the co-benefits associated with the project, and the vintage year.</p>	<p>Adoption of “agri-carbon” protocols will require extensive technical capacity (e.g. technical specialists) available at the institutional and farm level.</p> <p>Moreover, technical knowledge for verification and certification of carbon credits through on-farm inspections or third-party review, establishing payment systems, etc. is imperative for successful implementation of emissions reducing projects.</p>	<p>Farmers must demonstrate that the emissions offsets generated are in addition to what would have occurred through regular operations. In the California Rice Offsets Protocol, to prove additionality fields must have management records that demonstrate cultivation using flooding for at least 100 days during two previous cultivation cycles. Fields already implementing techniques that qualify for offset credits can still pursue credits, but existing practices will be built into the baseline management scenario, and do not meet additionality requirements. Undetermined additionality in carbon programs can lead to overestimating reduction of carbon emissions.</p>

5. Greenhouse Gas Mitigation Options and Costs for Agricultural Land and Animal Production within the United States, ICF International, NRCS/USDA

Will carbon farming become an incentive or an expense for farmers?

Farmers are well positioned to participate in carbon market and they are already doing so. The move to decarbonization has become essential, and so farmers have been forced to participate by the new economic necessities imposed by public policy and supported by the private sector move to sustainability. Corporations investor groups & other influencers have pledged decarbonization like never before and the carbon market is increasingly monetized. Although the opportunity to farm “carbon” is clear and significant to the agriculture sector, the following key questions remain to need to be understood for the development of this market going forward:

1. How will food and agriculture corporations address their carbon commitments and seek agriculture as a solution?
2. How will program structure and carbon payments evolve to bring not only innovative farmers but a broader farmer base to participate globally?
3. How regulations & standards to certify will effect carbon sequestration and allow voluntary trading schemes to develop?
4. How new technologies & innovation will respond to incentives to decarbonize and reduce demand for carbon credits.

IHS Markit is deeply involved with clients in coming up with solutions to the above and other questions related to decarbonization. Working together with our colleagues in our ESG, Energy, Automotive, Maritime & Transportation and macro Economic divisions, we are well equipped to stay on top of events in this space as they evolve and develop unique solutions.

IHS Markit Agribusiness Consulting has already helped answer these questions through a number of client studies, including

- The impact of new Biden administration rejoining the Paris Agreement on agriculture
- The impact of European New Green Deal on European carbon market
- Review of efforts by USDA Bill to develop carbon sequestration protocols
- Current carbon market assessments in the agricultural sector
- Assessment of carbon pledges by global agribusinesses



FOR MORE INFORMATION, PLEASE CONTACT:

Sana Khan – Sana.khan@ihsmarkit.com
Consultant - IHS Markit Agribusiness Consulting

Juan Sacoto – Juan.sacoto@ihsmarkit.com
Executive Director - IHS Markit Agribusiness Consulting
(North America)

Edward Oliver – Edward.oliver@ihsmarkit.com
Executive Director - IHS Markit Agribusiness Consulting
(Europe)

Richard Brostowicz – Richard.brostowicz@ihsmarkit.com
Executive Director - IHS Markit Agribusiness Consulting
(Brazil)

Tom P. Scott – Tom.P.Scott@ihsmarkit.com
Vice President - IHS Markit Agribusiness Consulting

Nolin Huddleston – Nolin.Huddleston@ihsmarkit.com
Commercial Director - IHS Markit Agribusiness Consulting

About IHS Markit

IHS Markit (NYSE: INFO) is a world leader in critical information, analytics and expertise to forge solutions for the major industries and markets that drive economies worldwide. The company delivers next-generation information, analytics and solutions to customers in business, finance and government, improving their operational efficiency and providing deep insights that lead to well-informed, confident decisions. IHS Markit has more than 50,000 business and government customers, including 80 percent of the Fortune Global 500 and the world's leading financial institutions. Headquartered in London, IHS Markit is committed to sustainable, profitable growth.

IHS Markit Agribusiness

Our Agribusiness Consulting solutions provide the cutting-edge research and forecasts necessary to gain a competitive edge. We offer over 200 agribusiness experts based in Asia, Europe, North America and South America, analysts and researchers who are well respected throughout the industry for their deep-rooted analysis and forecasts. The value that IHS Markit agribusiness can now offer has been extended by connecting agribusiness clients with the vast resource of insight and expertise that exists across IHS Markit including energy (including biofuels), supply chain, automotive, country risk and economics.

CUSTOMER CARE

NORTH AND SOUTH AMERICA

T +1 800 447 2273
+1 303 858 6187 (Outside US/Canada)

EUROPE, MIDDLE EAST AND AFRICA

T +44(0) 134 432 8300

ASIA PACIFIC

T +604 291 3600

JAPAN

T +81 3 6262 1887

E CustomerCare@ihsmarkit.com

